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## FATE OF HEXAZINONE AND PICLORAM IN SOUTHERN UNITED STATES FOREST WATERSHEDS.

Herbicides are being used more frequently in the intensively managed forest ecosystems of the southeastern United States. Most of this increased use occurs during site preparation prior to replanting cutover or converted stands. Herbicides provide a cost effective tool for controlling herbaceous and woody weed competition which adversely affects pine establishment and early growth. Herbicides are also useful in minimizing erosion which can affect site productivity and water quality. Since forested watersheds throughout the South are sources for high quality municipal and domestic drinking water, there has been considerable concern over the potential for water contamination with herbicide residues. This paper highlights the results from several ecosystem fate studies which have evaluated the environmental fate of two commonly used forestry herbicides, hexazinone and picloram.

Hexazinone fate and movement in forested watersheds has been evaluated in studies in Georgia, Tennessee, Florida, Kentucky, Arkansas, and Alabama. Direct fall of hexazinone granules into streams has produced short-term (<24 hr) concentrations of 2,500 ppb. Application of granules to ephemeral watersheds in the upper Piedmont produced stormflow concentrations of 442 ppb and subsurface baseflow concentrations of <20 ppb. Residue levels fell rapidly with subsequent storms. In Tennessee, aerial application of hexazinone granules produced no detectable herbicide residues in baseflow. A study in Arkansas using a liquid formulation did not detect any residues in stormflow but measured low level concentrations (<20 ppb) in baseflow for over a year. Injection of hexazinone into hardwood stems has not resulted in any off-site movement of hexazinone residues on a variety of sites.

A ground application of picloram in steep terrain of the Appalachian Mountains produced no significant off-site movement. Picloram residues were detected infrequently at low levels (<10 ppb) in streamflow from 10 and 30 ha watersheds. In the upper Coastal Plain, and aerial application of picloram pellets produced stream concentrations of 500 ppb after treatment. Although concentrations fell rapidly, low levels were still detected over a year later. Use of picloram in combination with 2,4-D for injection of hardwoods did not result in any detectable off-site movement from a number of watersheds in Alabama, Georgia, Tennessee, and Kentucky.